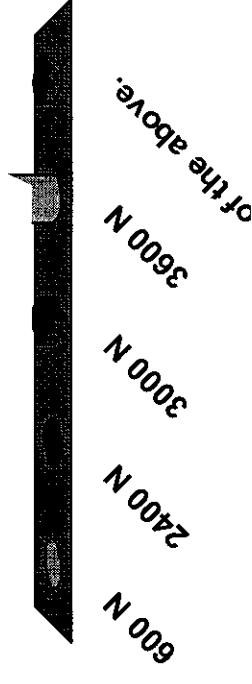


A 60 kg fighter pilot's ejection seat accelerates him upward at a rate of 5 times g ("5 g's"). If his seat had a weight scale built in, what would it read during his ejection?

- 1. 600 N**
- 2. 2400 N**
- 3. 3000 N**
- 4. 3600 N**
- 5. None of the above.**



The correct answer is #4: 3600 N, by either of two methods:

(a) Use NII in inertial frame: $F_{\text{NET}} = m \cdot a = +m \cdot (5 |g|)$;
 $F_{\text{NET}} = F_{\text{Grav}} + F_{\text{Seat}} = +m \cdot 5 \cdot |g|$; & $F_{\text{Grav}} = -m |g|$;
Thus, $F_{\text{Seat}} = mg(5+1) = (60)(10)(6) = 3600 \text{ N}$.

• OR (b) use frame accelerating at $A = +5 |g|$, with inertial pseudo-force

$F_{\text{Pseudo}} = -mA = -m(5 |g|)$, and physical force,

$F_{\text{Phys}} = F_{\text{Seat}} + F_{\text{Grav}}$. Then a NII-like calculation

gives $F_{\text{Phys}} + F_{\text{Pseudo}} = ma' = 0$ (since man has zero acceleration in this frame). Thus,

$$F_{\text{Seat}} = -(F_{\text{Grav}} + F_{\text{Pseudo}}) = -(-mg - m \cdot 5 |g|)$$

$$F_{\text{Seat}} = -(-6 \cdot 60 \cdot 10) = +3600 \text{ N}.$$